

outlet of the outlet muffler. The enclosure preferably also includes a third aperture for passage of one or more wires for transmitting power or control signals to an electric motor and/or other electrical components, the third aperture being substantially sealable relative to the exterior of the wire(s).

According to a second aspect, the present invention provides a method of assembling an apparatus for supplying breathable gas according to the first aspect of the invention, the method comprising the steps of:

assembling the noise producing component(s) into a sub-assembly;

placing the sub-assembly into the interior of the thin flexible enclosure through an opening therein;

substantially sealing the opening; and

placing the flexible enclosure within the external housing.

# BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is a schematic view of an embodiment of an apparatus for supplying breathable gas according to the invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figs. 1 shows an apparatus 1 for supplying breathable gas. More specifically, the apparatus 1 is adapted for use a CPAP apparatus. The apparatus 1 comprises a relatively rigid external housing 2 which is generally in the form of upper and lower housing halves produced from a plastic material. Internal the housing 2 there are several components capable of producing noise. In the embodiment shown in Fig. 1 these components include an inlet muffler 3, a blower 4, a conduit 5 and an outlet muffler 6.

The inlet muffler 3 has an inlet 11 open to atmosphere and an outlet (not shown) connected to the inlet (not shown) of the blower 4. The blower 4 has an outlet 12 connected to the inlet 13 of the conduit 5. The conduit 5 has an outlet 14 connected to the inlet 15 of the outlet muffler 6. The outlet muffler 6 also includes an outlet 7 which is connected to a conduit or tube (not shown) which communicates the pressurised gas produced by the blower 4 to a patient mask (not shown).

Air from atmosphere drawn into the inlet muffler 3 is indicated by arrow 16. Pressurised air leaving the outlet muffler 6 is indicated by arrow 17.

The apparatus 1 also includes a thin flexible enclosure indicated by dashed lines 8. The enclosure 8 extends around the noise producing components 3, 4, 5 and 6 and is substantially sealed with respect to same. The enclosure 8 includes a first aperture 18 sealed with respect to the exterior of the inlet 11 of the inlet muffler 3, a second aperture 19 sealed with respect to the exterior of the outlet 7 of the outlet muffler 6 and a third aperture 20 sealed with respect to the exterior of wires 21 used to

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communicate power and/or control signals to the motor (not shown) of the blower 4 and other electrical components. In this way, the flexible enclosure 8 effectively isolates the exterior of the components 3, 4, 5 and 6 from their surroundings but still allows passage of air into and out of those components.

- 5 The enclosure 8 is preferably made from a plastics material for example a polymer such as Cosmothene F221-1 or polyethylene. The enclosure 8 is generally of bag like construction with an opening at one end that leads to an interior 9.

- 10 To assemble the apparatus 1, the components 3, 4, 5 and 6 are all assembled together into a sub-assembly and passed through an opening into the interior 9 of the enclosure 8. The apertures 18, 19, 20 in the enclosure 8 are located in sealed relationship with respect to the exterior of the inlet 11, the outlet 7 and the wires 21 respectively. The opening in the enclosure 8 is then preferably sealed by adhesive tape. Other adhesives or heat sealing can also be used to seal the opening in the enclosure 8. In this connection, it will be appreciated that it is not imperative to achieve a completely air tight or hermetic seal between the enclosure 8 and the components 3, 4, 5 and 6 that the enclosure 8 surrounds. The sub-assembly of noise producing components and enclosure is then placed between the two halves with the housing 2 which are then joined in the known manner to complete the apparatus 1.

- 20 The interior 9 of the enclosure 8 can be left substantially empty or can be filled with foam or bubble wrap or the like.

- Testing of two similar prototype CPAP apparatus (denoted 1. and 2.) with and without the flexible enclosure 8 revealed the following average dBA noise levels from measurements taken at the front, back, left and right side of the housing 2 with both the CPAP apparatus being operated to produce gas flow at a pressure of 10 cm H<sub>2</sub>O

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| CPAP Apparatus | Without enclosure<br>(dBA) | With enclosure<br>(dBA) |
|----------------|----------------------------|-------------------------|
| 1.             | 34.2                       | 32.4                    |
| 2.             | 34.5                       | 32.0                    |

Accordingly, as these results show, the invention provides a very simple and inexpensive way of reducing the noise radiated from the housing by approximately 2 dBA.

- 30 Other advantages include the ease of installation of the flexible enclosure, and corresponding ease of replacement. The apparatus is also easier to sterilise, as the

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components of the apparatus through which air is drawn are effectively isolated from other components, such as electrical circuitry.

Although the invention has been described with reference to a preferred embodiment, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

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